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New data on some microhymenopteran families from Lagodekhi Protected Area, with new records for Georgia (Sakartvelo) and the Caucasus

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Abstract

We present data on the distribution of seven wasp families, Ceraphronidae, Diapriidae, Ismaridae, Megaspilidae, Platygastridae, Proctotrupidae and Scelionidae, collected in Georgia (Sakartvelo). Thirty-three genera are recorded for the first time from Georgia and 25 of them for the Caucasus. From these, 16 species level taxa are newly recorded in Georgia, and 14 identified species are new records for the Caucasus. This brings the number of known insect species in the Lagodekhi Protected Area (LPA) to 1682.

Key words

Ceraphronidae, Diapriidae, Megaspilidae, Platygastridae, Proctotrupidae, Scelionidae, parasitic wasps, South Caucasus

Introduction

Except for some families belonging to the Chalcidoidea superfamily, microhymenopterans in Georgia (Sakartvelo) are scarcely studied. Notwithstanding this neglect, the group contains some of the most important biological control agents of phytophagous insects, in particular selected species of Scelionidae (Japoshvili et al. 2022). Moreover, parasitoid wasps are a major component of many terrestrial ecosystems, and may constitute up to 20% of all insect species (LaSalle and Gauld 1991; Godfray 1994; Memmott et al. 1994). Here, I present hymenotperan survey results conducted in Lagodekhi Protected Area (LPA). The LPA was established in 1912, and is located in the extreme north-eastern part of Georgia along the southern slope of the Greater Caucasus Mountains. Elevations in this region range from 590 to 3500 m. The LPA is among the most diverse and best-studied protected areas in Georgia, with 1666 insect species records to date (Japoshvili et al. 2022). More than 10 publications have been published during last 10 years detailing hundreds of new records for fauna within the LPA and Georgia (Japoshvili et al. 2016, 2017, 2019; Japoshvili and Kostjukov 2016, 2017; Kostjukov et al. 2016a,b; 2017; Kostjukov and Japoshvili 2016a,b; Gul Aslan et al. 2017; Japoshvili 2017, 2018; Dobosz et al. 2018; Dvorak et al. 2018; Otto and Japoshvili 2018; Riedel et al. 2018; Japoshvili and Khachikov 2021). Here we provide additional new faunistic records of hymenopterans in the LPA, documenting the first records of these taxa in Georgia and/or the Caucasus.

Material and methods

We collected samples in Lagodekhi Protected Area using malaise traps during the entire growing season, from April to

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November of 2014. Malaise traps were placed in seven different areas with the following vertical zonal characteristics:
H1: low-altitude forest (450–750 m), 666 m, N41.852483, E46.287767;
H2: mid-altitude forest (750–1250 m), 847 m, N41.85585, E46.292733;
H3: high-altitude forest (1250–1800 m), 1351 m, N41.871467, E46.311533;
H4: subalpine forest (1800–2000 m),1841 m, N41.882733, E46.32185;
H5: subalpine forest (1800–2000 m), 1902 m, N41.885583, E46.324117;
H6: Subalpine meadows and shrublands (2000–2500 m), 2230 m, N41.89805, E46.333883;
H7: alpine zone (above 2500 m), 2559 m, N41.906183, E46.3334.
Malaise traps were obtained from B & N Entomological services (http://www.entomology.org.uk/). Traps were emptied every 10 (± 2) days and stored speciments in 96% alcohol. Subsequently, samples were CPD dried and card mounted (Noyes, 2019). After sorting, all microhymeniopterans not belonging to the Chalcidoidea superfamily and/or Cynipoidea were sent to Dr Lubomir Masner, who screened, sorted and prepared the specimens for further determination. Identifications were done by L. Masner using published keys (Medvedev 1978; Townes and Townes 1981; Kozlov and Kononova 1983).
All voucher and type specimens were deposited in the entomological collection of the Agricultural University of Georgia, Tbilisi, Georgia. New records for Georgia are indicated with one asterisk, two asterisks next to the taxon name indicates the taxon, new to the Caucasus.

Results and discussion

Annotiated list of species

Order: Hymenoptera

Family: Diapriidae Haliday, 1833

- Only two species, *Psilus punctiventris* (Kozlov) and *Spilomicrus cursor* Kieffer, were known from Georgia (Apkhazeti and Achara (Batumi)), according to Medvedev (1978).

Genus: *Entomacis* Förster, 1856**
Entomacis perplexa (Haliday, 1857)
- GEORGIA • 1 Female; H3; 3.V.2014. 1 Female; H4-5; 25.VI-5.VII.2014. 1 Female; H6; 23.V-13.VI.2014.

Entomacis platyptera (Haliday, 1857)
- GEORGIA • 1 Female; H1; 25.V-4.VI.2014.

Family: Ismaridae Thomson, 1858**
- This family was historically considered as a subfamily of Diapriidae. However, based on recent integrative taxonomic investigation, the Ismarinae subfamily was elevated to family rank including the single genus *Ismarus* Haliday (Sharkey et al. 2012). There are no previous records of this family occurring in the Caucasus region.

Genus: *Ismarus* Haliday, 1835
Ismarus dorsiger (Haliday, 1831)
- GEORGIA • 1 Female; H5; 5-15.VII.2014. 1 Female; H6; 26.VII-6.VIII.2014.

Ismarus haliday Foerster, 1850
- GEORGIA • 1 Female, 1 Male; H6; 23.V-13.VI.2014.

Family: Megaspilidae Ashmead, 1893
- Only one genus and one species, *Megaspilus dux* (Curtis), was previously known from Georgia, according to Alekseev and Radchenko (2001).

Genus: *Trichosteresis* Forster, 1856**
Trichosteresis glabra (Boheman, 1832)
- GEORGIA • 2 Females; H5; 23.V-13.VI.2014. 2 Females; H5; 5-15.VII.2014. 1 Male; H5; 26.IX-6.X.2014.

Family: Platygastridae Haliday, 1833
- Prior to our study, 5 species representing 5 genera were recorded from Georgia, including *Allotropa conventus* (Maneval) and *Synopeas figitiformis* Thomson (Medvedev 1978), *Acerotella boter* (Walker), *Amblyaspis aliena* (Nees), *Leptaces laodices* (Walker) (Timokhov 2019).

Genus: *Iphitrachelus* Haliday, 1836**
Iphitrachelus gracilis Masner, 1957
- GEORGIA • 1 Male; H1; 4-14.VI. 2014.

Iphitrachelus lar Haliday, 1835
- GEORGIA • 1 Female; H1; 25.V-4.VI.2014. 1 Female; H6; 5-15.VIII.2014.

Genus: *Metaclisis* Förster, 1856**
Metaclisis areolata (Haliday, 1835)
- GEORGIA • 1 Female; H1; 17-23.IV.2014.

Genus: *Platystasius* Nixon, 1937**
Platystasius transversus (Thomson, 1859)
- GEORGIA • 1 Female; H1; 5-15.VI.2014. 1 Female; H2; 25.V-4.VI.2014. 1 Female; H2; 25.VI-5.VII.2014. 1 Female; H6; 5-15.VII.2014.

Family: Proctotrupidae Latreille, 1802
- According to Lelej (2012) , the following 19 species have been recorded from Georgia prior to our studies: *Brachyserphus parvulus* (Nees), *Codrus picicornis* (Foerster,), *Cryptoserphus aculeator* (Haliday), *C. dilates* Townes, *C. flavipes* (Provancher), *C. medius* Townes, *Disogmus areolator* Haliday, *D. basalis* (Thomson), *Exallonyx ater* (Gravenhorst), *E. brevicornis* (Haliday), *E. crenicornis* (Nees), *E. minor* Townes, *E. wasmanni* Kieffer, *Mischoserphus obesus* Townes, *Phaenoserphus chittii* (Morley), *P. nigripes* (Ashmead), *P. viator* (Haliday) and *Proctotrupes gravidator* (Linnaeus). *M. arcuator* (Stelfox) was recorded by Izadihzadeh et al. (2016) from Georgia.

Genus: *Brachyserphus* Hellen, 1941
Brachyserphus parvulus (Nees, 1834)
- GEORGIA • 4 Females, 1 Male; H5; 5-15.VII.2014.

Genus: *Disogmus* Förster, 1856
Disogmus areolator (Haliday, 1839)

- GEORGIA • 3 Females, 4 Males; H1; 25.V-4.VI.2014. 1 Female, 1 Male; H2; 15-25.V.2014. 1 Female; H4-5; 25.VI-5.VII.2014. 2 Females ; H5; 5-15.VII.2014. 2 Males; H6; 23.V-13.VI.2014.

Genus: *Exallonyx* Kieffer, 1904

Exallonyx brevicornis (Haliday, 1839)

- GEORGIA • 2 Females; H4-5; 25.VI-5.VII.2014. 1 Female; H6; 5-15.VII.2014. 1 Female; H5; 23.V-13.VI.2014.

Mischoserphus arcuator (Stelfox, 1950)

- GEORGIA • 1 Female; H1; 25.V-4.VI.2014. 3 Females; H4-5; 25.VI-5.VII.2014.

Genus: *Phaenoserphus* Kieffer, 1908

Phaenoserphus calcar (Haliday, 1839)**

- GEORGIA • 1 Male; H4; 5-15.VII.2014.

Genus: *Tretoserphus* Townes, 1981**

Tretoserphus laricis (Haliday, 1839)

- GEORGIA • 4 Females; H3; 3.V.2014.

Family: Scelionidae Haliday, 1839

- Ninteen species belonging the Scelionidae family have been recorded prior to our studies from Georgia: *Duta tenuicornis* (Dodd), *Proteleas tridentstus* Kozlov, *Telenomus chloropus* (Thomson), *T. hofmanni* Mayr, *T. oophagus* Nikolskaja, *Trimorus elongatus* (Kieffer), *T. pedes* (Kieffer), *Trissolcus tumidus* (Mayr) (Lelej 2012), *Encyrtoscelio apterus* (Szelenyi), *Eremioscelio cydnoides* Priesner, *Psilanteria bicolor* (Kieffer), *Teleas quinquespinosus* Szabo, *T. sibiricus* Kieffer and *T. sulcatus* (Kozlov) (Timokhov 2019b). Recently, Japoshvili et al. (2021) reported following species from Georgia: *T. belenus* (Walker), *T. colemani* (Crawford), *T. cultratus* (Mayr), *T. scutellaris* (Thomson), *T. semistratius* (Nees).

Genus: *Idris* Förster, 1856**

Idris pedestris (Kieffer, 1908)

- GEORGIA • 1 Female; H1; 26.VII-6.VIII.2014. 1 Female; H1; 17.IX-6.X.2014. 1 Female; H2; 20.VII-5.VIII.2014. 1 Female; H2; 23.VIII.-4.IX.2014.

Genus: *Scelio* Latreille, 1805*

Scelio rugulosus Latreille, 1805**

- GEORGIA • 1 Female; H1; 25.V-4.VI. 1 Female; H5; 5-15.VIII.

Genus: *Teleas* Latreille, 1809

Teleas lamellatus Szabo, 1956*

- GEORGIA • 1 Female; H5; 5-15.VIII.2014.

Genus: *Trissolcus* Ashmead, 1904

Trissolcus basalis (Wollaston, 1858)*

- GEORGIA • 1 Female; H2; 5-15.VII.2014. 1 Female; H5; 23.V-13.VI.2014.

Trissolcus cultratus (Mayr, 1879)

- GEORGIA • 2 Females; H1; 26.VII-6.VIII.2014. 1 Female; H2; 25.V-1.VI.2014. 1 Female; H3; 12-31.V.2014. 13 Femlaes; H6; 23.V-13.VI.2014. 1 Female; H6; 5-15.VII.2014.

Genus: *Xenomerus* Walker, 1836**

Xenomerus ergenna Walker, 1836

- GEORGIA • 10 Females; H6; 25.VI-5.VII.2014. 1 Female; H5; 15-25.VI.2014.

Additional remarks

In addition, a number of taxa were recorded in the LPA which have unknown species identities. These include *Aphanogmus* sp. (Ceraphronidae) (1 Female; H1; 5-15.VI.2014) (from this genus, the only species, *A. steinitzi* Priesner, was recorded from Achara region of Georgia (Medvedev 1978)), *Acanosema* sp.** (1 Female; H1; 25.VI.-5.VII.2014), *Acropiesta* sp.** (1 Female; H2; 15-25.VI.2014), *Aneurhynchus* sp.** (1 Female; H3; 15-25.VI.2014), *Basalys* sp.** (1 Female; H3; 15-25.VI.2014), *Pantoclis* sp.** (1 Female; H4; 5-15.VII.2014), *Paramesius* sp.** (1 Male; H1; 5-15.VI.2014), *Synacra* sp.** (1 Female; H6; 5-15.VII.2014), *Trichopria* sp.** (1 Female; H6; 25.VII-3.VIII.2014), *Cinetus* sp.* (1 Female; H4; 5-15.VII.2014) (all from the family Diapriidae), *Atritomellus* sp.** (1 Female; H6; 23.V.-3.VI.2014), *Conostigmus* sp.** (1 Female; H3; 3.V.2014), *Dendrocerus* sp.* (1 Female; H6; 5-15.VII.2014), *Lagynodes* sp.* (1 Female; H6; 15-25.VII.2014) (all ffrom the family Megaspilidae), *Acerotella* sp. (1 Female; H2; 15-25.V.2014), *Allotropa* sp. (1 Female; H6; 15-25.VII.2014), *Amblyaspis* sp. (1 Female; H6; 15-25.VII.2014), *Isocybus* sp.** (1 Female; H6; 25.VI.-5.VII.2014), *Piestopleura* sp.** (1 Female; H6; 5-15.VII.2014), *Platygaster* sp.** (1 Female; H3; 3.V.2014) *Pyrgaspis* sp.** (1 Female; H5; 5-15.VIII.2014), *Tetrabaeus* sp.** (1 Female; H1; 26.VII.-6.VIII.2014), *Leptacis* sp.* (1 Male; H1; 5-15.VI.2014. 1 Female; H6; 5-15.VII.2014), *Synopeas* sp.* (1 Female; H6; 5-15.VIII.2014), *Cryptoserphus* sp. (1 Female; H4-5; 25.VI.-5.VII.2014) (all from the family Platygastridae), *Anteris* sp.** (1 Female; H1; 5-15.VI.2014), *Gryon* sp.* (1 Female; H1; 5-15.VI.2014), *Sparasion* sp.* (1 Male; H5; 5-15.VIII.2014), *Telenomus* sp. (1 Male; H5; 5-15.VII.2014) and *Trimorus* sp. (1 Male; H6; 5-15.VII.2014) (all from the family Scelionidae).

In summary, new records to Georgia or the Caucasus were identified, and a number of unidentified taxa belonging to seven wasp families, Ceraphronidae, Diapriidae, Ismaridae, Megaspilidae, Platygastridae, Proctotrupidae and Scelionidae, were collected in the LPA. Sixteen of these species were new country records for Georgia (14 new for the Caucasus) and thus the number of insect species recorded from LPA has reached 1682 species (Japoshvili et al. 2022). From the species identified to morpho species level, 33 genera, have been newly recorded from Georgia and 25 of them are new for the Caucasus. Undoubtedly, the current knowledge of hymenopterans of Georgia and the Caucasus in general is incomplete and further research will almost certainly reveal many new taxa.

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დასკვნა

ნაშრომში წარმოდგენილია სიფრიფანაფრთიანების კვლევის შედეგები ლაგოდეხის დაცული ტერიტორიებიდან. შესწავლილი იქნა შვიდი ოჯახი (Ceraphronidae, Diapriidae, Ismaridae, Megaspilidae, Platygastridae, Proctotrupidae and Scelionidae) რომელთაგან ერთი ოჯახი წარმოადგენს პირველ შეტყობინებას კავკასიის რეგიონისთვის. 16 სახეობა ახალია საქართველოსთვის, მათგან 14 კი კავკასიისათვის. ასევე, სახეობებიდან, რომლებიც გაირკვა მორფო სახეობის დონეზე 33 გვარი ახალია საქართველოსათვის, მათგან 25 კი კავკასიისათვის. კვლევის შედეგების შედეგად ლაგოდეხის დაცული ტერიტორიებისთვის აღწერილ მწერთა სახეობების რაოდენობა გაიზარდა 1682 სახეობამდე.

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